Developing Collaborations Between Researchers and Educators: Bay Watershed Education and Training Program (B-WET)

George I. Matsumoto
Senior Education & Research Specialist – MBARI
(Monterey Bay Aquarium Research Institute)

Draft Mission Statement

MBARI's educational mission is to build upon our unique strengths in science and technology to provide advanced knowledge and understanding of the ocean.

Guiding Principle

MBARI must *exchange information and technology, build relations with other research and education communities, and enhance collaborations to mitigate the institute's limited resources.*

Expectations and Desires

We expect MBARI staff to continue their excellent efforts to publish in high quality journals, make presentations at professional meetings, and disseminate information and products to our research peers.

The purpose of this plan is to encourage educational activities that would otherwise not be the norm for a non-degree-granting research institution.

2005 estimated E&O resources

- MBARI ~ 0.03% of total budget
- ORION ~ 0.01% of total budget
- WHOI ~ 0.04% of total budget
- SIO ~ 0.07% of total budget

Researchers and Education

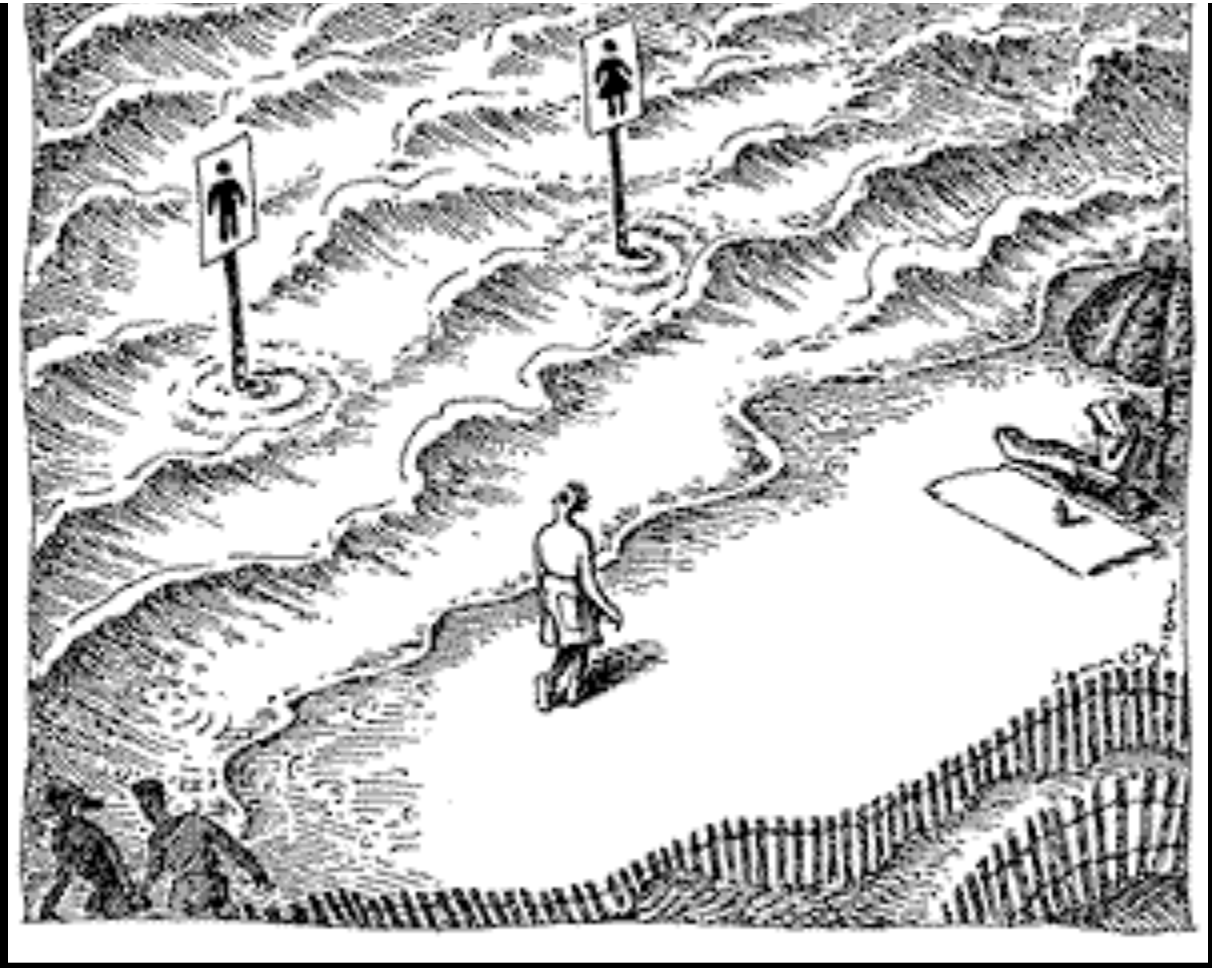
Can (should??) scientists contribute to science education?

What is the contemporary educational context with which scientists must become familiar?

What are the basic steps for integrating 'practical' scientists into K-16 science education?

Is there a problem?

- Nearly 30% of 18-24-year-olds in the US cannot correctly locate the Pacific Ocean on a map.
- The majority students in the midwest do not believe that there is anything they personally do that affects the health of the oceans.



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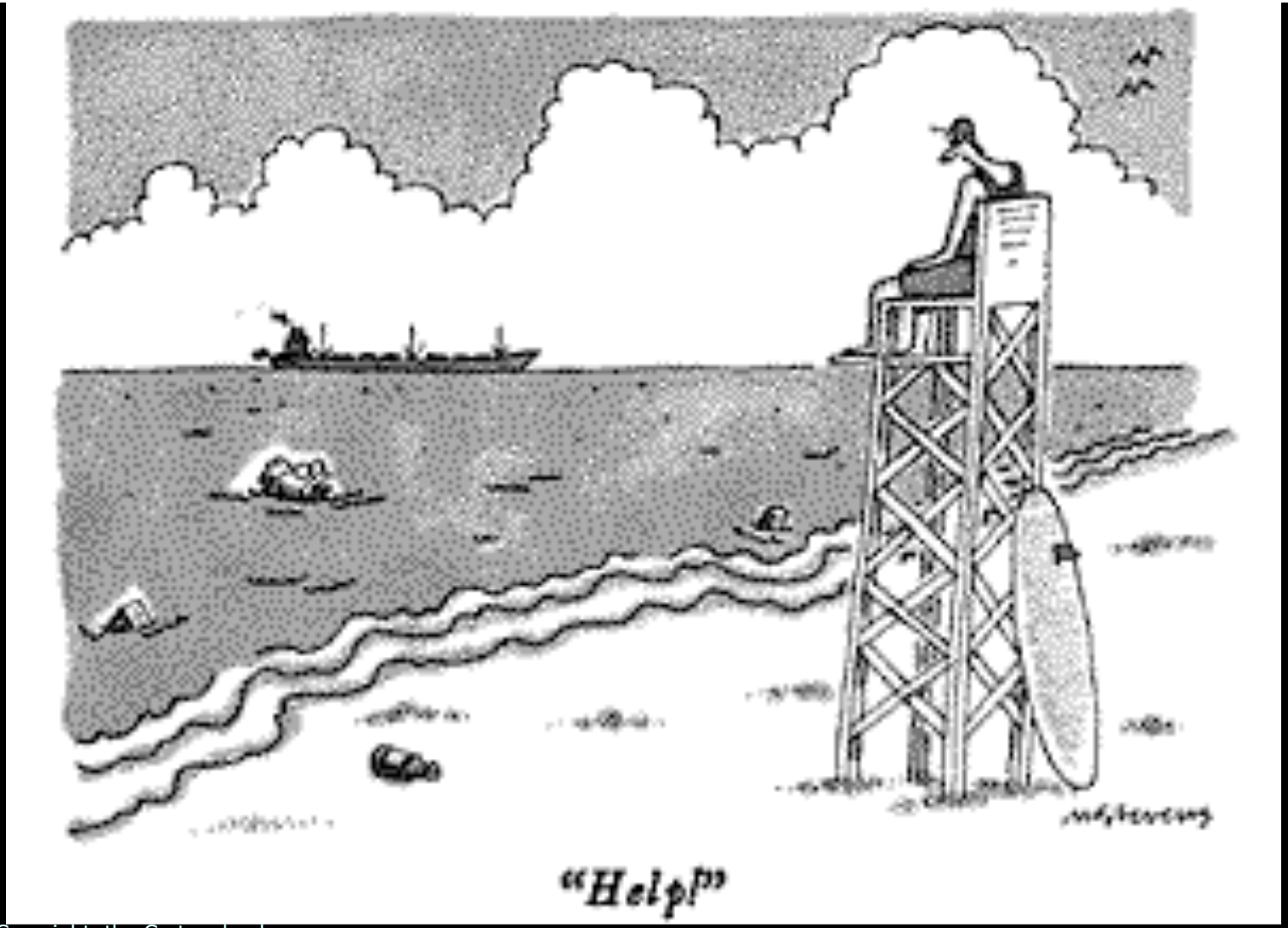
Only 14% of Americans recognize that humans are the greatest source of ocean pollution.



OK - so there is a problem.

We need students to become informed citizens on issues such as…

- Global warming
- CO_2 sequestration
- Iron fertilization
- Designation of marine protected areas
- Coastal development
- Agricultural runoff
- Marine safety

General Issues

- Many high school students (and parents) oppose requiring 3 sciences for high school graduation.
- Ocean science material is engaging even to very young students, but elementary and junior high teachers are frequently unfamiliar with the subject matter. (Only 3% of elementary school teachers have a college course in the geosciences.)

Scientific Literacy (NSTA)

A *scientifically literate* person can…

- **Experience the richness and excitement of knowing about and understanding the natural world.**
- **Use appropriate scientific processes and principles in making personal decisions.**
- **Engage intelligently in public discourse and debate about matters of scientific and technological concern.**
- **Increase their economic productivity through the use of the knowledge, understanding, and skills of the scientifically literate person.**

A Guide to Constructing an Educational Component Targeted at K-16

Establish Goals & Set Priorities

Goals for Researchers

- Dissemination of data, project importance
- Increased applicant pool in the future

Goals for Educators

- Improved understanding of Scientific Inquiry
- Develop skills of Observation and Question
- Incorporate Inquiry into Science Education
- Stimulating Experience

Goals for Students

- Improved understanding of Scientific Process
- First-hand exposure to ‘practical scientists’
- Stimulating Experience

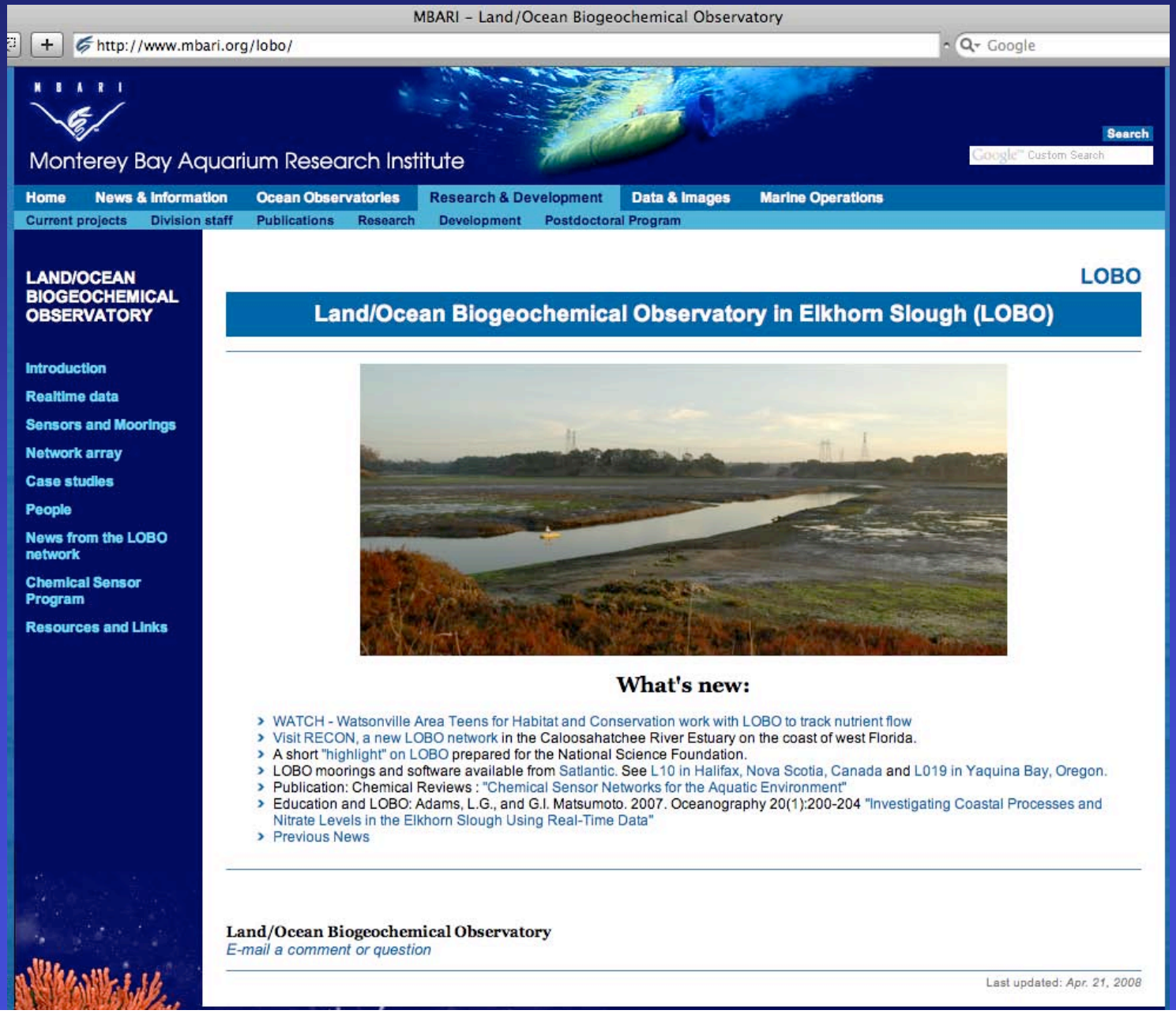
A Guide to Constructing an Educational Component Targeted at K-16

Identify Partnerships

- *Elkhorn Slough National Estuarine Research Reserve*
- *Local School Boards:* **Project 'buy-in'**
- *Teachers:* **Participation**
- *Parents:* **Student participation**
- *MBARI: Land Ocean Biogeochemical Observatory*
- *MBARI/MBA: Education and Research: Testing Hypotheses*

Land Ocean Biogeochemical Observatory (LOBO)

www.mbari.org/lobo www.mbari.org/EARTH



Education And Research: Testing Hypotheses (EARTH)

www.mbari.org/EARTH

Land Ocean Biogeochemical Observatory (LOBO)

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EARTH

- Coastal Processes main page
- Elkhorn Slough Case Study main page
- Case Study procedures ›

Coastal Processes

Elkhorn Slough Nitrogen Case Study

Estuaries are home to an wide variety of organisms and represent delicate ecosystems. The Elkhorn Slough is the site of numerous human activities, including agriculture, recreation, transportation, fishing and energy production. With so many user groups struggling to coexist in the slough with as little disruption of the natural environment as possible, several essential questions arise. Do these activities add additional nutrients to the slough? Are they changing the delicate balance of life in the slough? Is nutrient loading a problem in this watershed? Where do the nutrients that arrive in this watershed originate from? What can be done to alleviate problems that may occur? This online case study will help students examine these questions.

Web resources

MBARI Land/Ocean Biogeochemical Observatory in Elkhorn Slough (LOBO)
This comprehensive resource is the main link to the LOBO project. It contains a wealth of information relative to this case study, including the goals of the project, background information on the Elkhorn Slough, useful links to other data resources, and descriptions of the technology and people involved in the project.

Elkhorn Slough Foundation
The Elkhorn Slough Foundation is a nonprofit, member-supported organization working to conserve and restore Elkhorn Slough and its watershed. Their home page provides a map, photos, and information about the variety of wildlife abundant in the slough, as well and slough news and events.

Elkhorn Slough National Estuarine Research Reserve
The Elkhorn Slough National Estuarine Research Reserve is one of 26 National Estuarine Research Reserves established nationwide as field laboratories for scientific research and estuarine education. This Web site provides information about research projects and conservation efforts in the slough.

SIMoN—Sanctuary Integrated Monitoring Network
SIMoN is an integreated, long-term program that takes an ecosystem approach to identify and understand changes to the Monterey Bay National Marine Sanctuary, which includes the Elkhorn Slough. This Web site provides an excellent overview of the estuarine environment, as well as specific projects currently underway.

Central and Northern California Ocean Observing System
The Central California Ocean Observing System (CeNCOOS) is a new initiative and part of the national ocean observing system, the Integrated Ocean Observing System (IOOS). The mission of CeNCOOS is to coordinate and support the development and implementation of a regional ocean observing system, which provides data and data products to a diversity of end users.

California Irrigation Management Information System (CIMIS)
The California Irrigation Management Information System (CIMIS) is a program of the Office of Water Use Efficiency (OWUE), California Department of Water Resources (DWR) that manages a network of over 120 automated weather stations in the state of California. Data available from Station #19, Castroville, can be used to correlate weather processes with Nitrogen in the slough.

Elkhorn Slough Tidal Processor
Data available from this tide chart can be used to correlate tidal cycles with Nitrogen in the slough.

Begin Case Study!

Conclusions

- There has never been a greater need for citizens informed about ocean issues
- Partnerships are critical in maximizing resources and effectiveness
- Effort will be needed to provide the information in an easily assimilated context
- Educators need to help by showing interest and desire to form partnerships